From 1872 to 1891 the Weather Bureau carried out similar temperature records along the Atlantic coast in rivers and harbors, but, owing to our prevailing westerly winds, the Atlantic Ocean temperatures have but little effect upon American weather. Temperature observations of the Pacific Ocean water would be more interesting, but we doubt whether it would explain the anomalies of the Pacific coast climates. The actual influence of our Great Lakes on the climate of stations on the windward side is appreciable by the increased cloudiness twenty miles from the shore, but not much beyond; its influence on the temperature is only appreciable by the prevention of early frosts by reason of the formation of cloud and fog. The general influence of the Atlantic Ocean on the weather of Great Britain, or of the Pacific Ocean on the weather of northern California, Oregon, and Washington is to produce cloud, fog, and rain and thus affect the temperature indirectly. The direct effect of a rise or fall in the temperature of the ocean surface is analogous to the direct effect of the changes in the temperature of a land surface. Both should be expressible by an algebraic formula, consisting essentially of two terms, viz: (1) a term expressing the heat given back to the air by conduction and convection and radiation, all of which, of course, is much larger by daytime and smaller by night-time for the land as compared to the ocean, and (2) a second term expressing the quantity of latent heat conveyed to the air by the evaporation of moisture, which on the average of the day and night is greater for the ocean than for the land. But when the lower layers of air thus warmed and moistened have moved to a great distance horizontally or vertically, or when, without much motion, this air is cooled down by radiation, then the land air keeps clear longer than the ocean air and it is this property that produces the great variety of climates to the leeward of the water.

It will be interesting to compare the actual figures for the monthly mean air temperatures on the west coast of Great Britain and on the west coast of North America, and the following table gives the figures as read off from the charts of Bartholomew's Physical Atlas, Plate VI of the British Isles, and Plate VIII for the United States and Canada. We have taken four representative points on the British coast, but only two on the American coast, because the latter are so much farther south in latitude that, strictly speaking, only the northernmost, viz, Vancouver Island, latitude 50°, should be compared with Lands End, latitude 50°.

Months.	Great Britain.				America.	
	Hebrides. Lat. 57°.	North Ireland. Lat. 55°.	South Ireland. Lat. 51°.	Lands End. Lat. 50°.	Vancouver. Lat. 50°.	Mouth of Columbia. Lat. 46°.
	°	°	°	°	°	°
January	42.5	42.0	44.5	44.5	42.0	40.0
February	42.0	42.0	45.0	45.5	40.0	42.0
March	42.0	43.0	46.0	46.0	43.0	46.0
April	45.0	47.0	49.0	49.5	47.0	49.0
May	49.0	51.0	52.5	53.0	49.0	55.0
June	54.0	55.0	57.5	58.5	54.0	57.0
July	55.5	58.0	59.5	61.5	55.0	60.0
August	56.0	58.0	60.0	61.5	55.0	60.0
September	54.0	55.0	57.0	59.0	53.0	57.0
October	49.5	50.0	52.0	54.0	49.0	53.0
November	45.5	45.0	48.0	49.0	45.0	47.0
December	44.0	44.0	46.0	46.0	40.0	42.0
Annual temperature	47.0	49.0	51.5	52.5	49.0	50.0
Annual ranges	14.0	16.0	14.0	16.0	15,0	20.0

The general character of the weather is controlled principally by the vertical ascent or descent of the wind and by its northern or southern direction much more than by the fact that it blows from the ocean. All winds that come from the Pacific have sufficient moisture to form rain and prevent the occurrence of either extremely hot or extremely cold weather, provided only they can be forced to rise up and be cooled dynamically or blow northward and be cooled by radiation. Both these causes conspire to form the winter rains on the Pacific coast north of latitude 40°, and also in Great Britain north of latitude 50°, but neither of them contribute to the formation of rain at any time of the ordinary year south of San Francisco, Cal., latitude 38°.—*C. A.*

TREES AS FORECASTERS OF RAIN.

A correspondent writes:

> People often say "it is a sign of rain when the wind blows up the leaves so as to show the white lower side." What is the element of truth, if any, in this that has given rise to this current statement?

Since there is no known meteorological reason for the phenomenon described, the question was submitted to the Chief of the Bureau of Plant Industry, United States Department of Agriculture, and we give herewith the reply received from Mr. A. F. Woods, Pathologist and Physiologist.

> It is true that people often say that the turning up of the leaves is a sign of rain. I have heard the remark many times, but as far as my observations go the sign does not seem to be a very sure one. There are many kinds of trees, like the silver-leaf poplars, in fact all the poplars, the maples, and some of the oaks, which turn their leaves up whenever there is a fairly strong, steady wind, but they do it as much in clear weather as in rainy. It has been suggested to me that possibly the belief may have arisen from the fact that winds capable of turning leaves over very often precede or follow rainstorms, and as people are usually on the alert when the general atmospheric conditions favor rain, looking for signs to confirm the general feeling they have that it is going to rain, it might be that the turning up of the leaves would be especially noted at such times.

METEOROLOGY IN ARGENTINA.

It is well known that our countryman, Dr. B. A. Gould, of Cambridge, Mass., after having established an astronomical observatory in Argentina, turned his attention to climatology and inaugurated a meteorological office, under the general directorship of Mr. Walter G. Davis, who had accompanied him from this country. After publishing about twenty annual volumes of meteorological observations and climatological investigations, Mr. Davis has now succeeded in realizing the great step in meteorology that has been taken by nearly every other climatological bureau. He has namely, organized in Buenos Ayres, under the Argentine Department of Agriculture, a branch office that publishes a daily weather map based on telegrams from all available points. A recent letter from Mr. Davis states that—

> Since the beginning of this year I have had my time fully occupied in getting the daily weather map service organized; it is now fairly started, but far from being complete. We have free use of the national telegraph lines, as well as of nearly all the private railway wires, for the transmission of the 2 p. m. observations. At present there are nearly 70 stations sending in complete observations and 350 pluviometric stations. Within the next few months I hope to have about 130 second-class stations and a large increase in the rain-reporting stations. The observations are sent here (Buenos Ayres) and the maps printed in our own establishment. The recent extension of the telegraph lines to the southern territories has been a great boon to us from a meteorological point of view; the coast line is now at Rio Gallegos, in Santa Cruz, and another branch is being constructed near the foot of the Cordillera from latitude 38° to 47° south, and then crosses the country to the Atlantic coast. This is a most important line for us, as it will give us communication with the region where nearly all the "pamperos" have their birth and development.
>
> No attempt has been made at forecasting, as I consider it better to have some experience with the conditions as shown by the daily maps before undertaking to do too much. I trust, however, that this branch of the work will come in due time.

The daily map published by the meteorological office at Buenos Ayres makes a very imposing appearance. It is 16.2 inches high by 11.1 broad and extends between the forty-sixth and seventy-seventh degrees of longitude west from Greenwich and between the twenty-first and fifty-seventh degrees of south latitude. This region in the Southern Hemisphere corresponds to a portion of the Northern Hemisphere, extending north and south, between Turks Island, the Bahamas, and Nain, Labrador, and, east and west, between the meridians of Washington, D. C., and Cape Farewell, Greenland. When this large region in the Southern Hemisphere shall have had its storms and "pamperos," its isobars and isotherms thoroughly studied, we shall feel that a great advance has been made in the meteorology of the globe.

We are not informed whether the daily weather map of the Province of Buenos Ayres, published for ten years past by the Observatory at La Plata, will be discontinued, but evidently the much more comprehensive work of the general Department of Agriculture must supersede that.

The elaborate presentation of Argentine climatology compiled by Dr. Davis for the official volume of statistics of that republic is about to appear, in Spanish and English text, as a special treatise by him on the climate of that region. The climatology of Dr. Davis and his new daily weather map show that the meteorology of the South Temperate Zone of America is in excellent hands.—*C. A.*

DANCING DERVISHES OR DUST WHIRLS.

A correspondent from Statesville, N. C., under date of June 6, 1902, sends the following interesting description of a phenomenon observed by him:

I have seen many whirlwinds but never before one like that observed yesterday about 3:30 p. m., some 4 miles south of Statesville. It consisted of four separate whirlwinds which followed each other to the left around the center of a circle 10 or 15 feet in diameter, like horses going around a horse power thrashing machine. The whole circle also seemed to be moving to the left and around the center of an enlarging coil. The motion was made apparent by dust taken up from the soil, and it could not well be seen above 10 or 15 feet from the ground. Sometimes, one or more of the small whirls would rise so as not to be visible, but presently it would touch the soil again in its regular place in the procession. This beautiful and curious motion continued for five minutes or more over a spot only about 100 feet in diameter. It then advanced northward the four whirls enlarging their circle to about 75 yards and then vanishing.

Dust whirls like that described above are not uncommon in hot, dry regions like the interior of Africa or India. One was observed in Kansas in 1897 (see Monthly Weather Review, Vol. XXVII, p. 111), but they are not often seen in this country. The following description from Whirls and Dust-Storms of India, by P. F. H. Baddeley, London, 1860, may be of interest:

Another curious phenomenon is often observed in a slowly-moving whirlwind; instead of appearing as a simple column, the dust whirl in contact with the ground, and for a few feet upward, is found to be composed of several distinct vortices, or spiral bodies, each one rotating on its axis as it revolves round and round the whirling circle. Each separate vortex having attached to it in its horizontal section, the same kind of fan-shaped train of dust, as was before remarked with regard to the smaller whirlwind columns.

This remarkable sight gives the idea of a fairy dance round a ring; and the motions are from all accounts, exactly imitated by the dancing Dervishes of Turkey; one of their holy exercises being to whirl round and round like a top; singly, or in company with several others, performing at the same time a gyration round in a circle, as if their dance originated in the very phenomenon now described. We may sometimes watch this motion for a length of time, without changing our position more than a few yards.

Buchan in his Handbook of Meteorology, London, 1868, page 306, gives the following explanation of these dust whirls:

Whirlwinds are often originated in the Tropics during the hot season; especially in flat, sandy deserts, which becoming unequally heated by the sun, give rise to numerous ascending currents of air. In their contact with each other, these ascending currents give rise to eddies, thus producing whirlwinds which carry up with them clouds of dust. Of this description are the ***dust-whirlwinds*** of India, which have been described and profusely illustrated by P. F. H. Baddeley.—*H. H. K.*

THE VARIATIONS OF THE TEMPERATURE OF THE FREE AIR AT GREAT ALTITUDES.

In the Monthly Weather Review for September, 1899, Vol. XXVII, p. 411, we published a translation of a memoir by Monsieur L. Teisserenc de Bort communicating the results of over 100 balloon ascensions, made at his observatory at Trappes, near Paris, for the purpose of investigating the temperature of the upper air. Up to that time meteorologists had generally assumed that as we ascend in the atmosphere not only do the regular diurnal and annual ranges of temperature, but also the nonperiodic or irregular variations, steadily diminish, so that we soon attain a region of uniform temperature. As a first result of the work of Teisserenc de Bort it seemed likely that the nonperiodic variations diminished very little with altitude so that we never attain a region in which the air temperature remains constant throughout the year. But a more careful examination of these data by Assmann and Berson, and especially their analysis of the temperatures observed in the balloon ascensions made from Berlin, made it evident that a region of uniform temperature, after all, may exist, but much higher up than was formerly supposed. A further contribution to this subject has lately been published by Teisserenc de Bort in the Comptes Rendus of the Paris Academy of Sciences for April 28, 1902, Vol. CXXXIV, pp. 987–989, showing the variations of temperature actually observed in the zone between 8 and 13 kilometers high; this we present to our readers in the following translation.—*C. A.*

I have the honor to communicate to the Academy the results of the discussion of observations made during 236 ascents of sounding balloons sent up from my observatory for dynamic meteorology, and which rose above 11 kilometers; 74 of them attained a height of 14 kilometers. These observations extend over several years and are distributed throughout the various seasons. They permit us for the first time to study the temperature of the atmosphere in the zone above a height of 10 kilometers, bringing to light new and unexpected facts, of which the following are the more striking:

1. In general the diminution of temperature with altitude increases as we leave the lower layers and attains in the upper regions hitherto explored a value quite near to that which corresponds to the adiabatic rate in dry air, but this decrease, instead of going on proportionally as we ascend as was formerly assumed, passes through a maximum, then diminishes rapidly until it becomes nearly zero at an altitude which in our region is on an average about 11 kilometers.

2. Starting with an altitude that varies between 8 and 12 kilometers, according to the atmospheric condition, there begins a zone characterized by a very small rate of diminution of temperature, or even by a slight increase, with alternations of cooling and warming. We are not able to state precisely the thickness of this zone, but, according to the observations already made, it would seem to amount to at least several kilometers.

This is a fact of which we were ignorant up to the present time, and it deserves to be taken into very serious consideration in the study of the general circulation. I ought to add that these results are not in agreement with many previous conclusions that had been based upon very insufficient evidence.

By considering the daily atmospheric conditions, we shall at once perceive that the point of inflection of the curve of temperatures varies within rather wide limits, between the altitudes 8 and 13 kilometers. This fact has attracted my attention ever since the ascents of our sounding balloons at night-time furnished sufficiently accurate data.[1] We quickly recognized that the ascensions in which the temperature ceases to decrease at an altitude of 8 or 9 kilometers are made during weather that is under the influence of barometric depressions, and that, on the contrary, the ascensions during high pressure are characterized by an elevation of the zone where the temperature tends to become uniform.

I have given to the Physical Society of Paris, in my communication of June 16, 1899, a very fine example of this phenomenon, by comparing the curves of the 14th and of the 23d of March, 1899; nevertheless as this result was absolutely new and contrary to theoretical predictions, I desired to multiply the experiments and overcome as far as possible the many causes of error before presenting the results to the Academy.

I had first to endeavor to secure ascensions, under difficult circumstances, that should attain altitudes sufficient to assure that the phenomenon to be studied should not be confined to the extreme or highest portion of the ascent of the balloon. As we approach the equilibrium stage (where the balloon floats along horizontally), the ventilation due to the ascending movement fails and we must fear the influence on the thermometer of the radiation from the sun and from the balloon, as also the influence of the mass or sluggishness of the self-register itself. After

[1] I have already explained to the Academy, in my note of 1898, the precautions taken in order to prevent the balloon from passing too rapidly in a vertical direction through the layers of air and to thus overcome the sluggishness of the thermometers.